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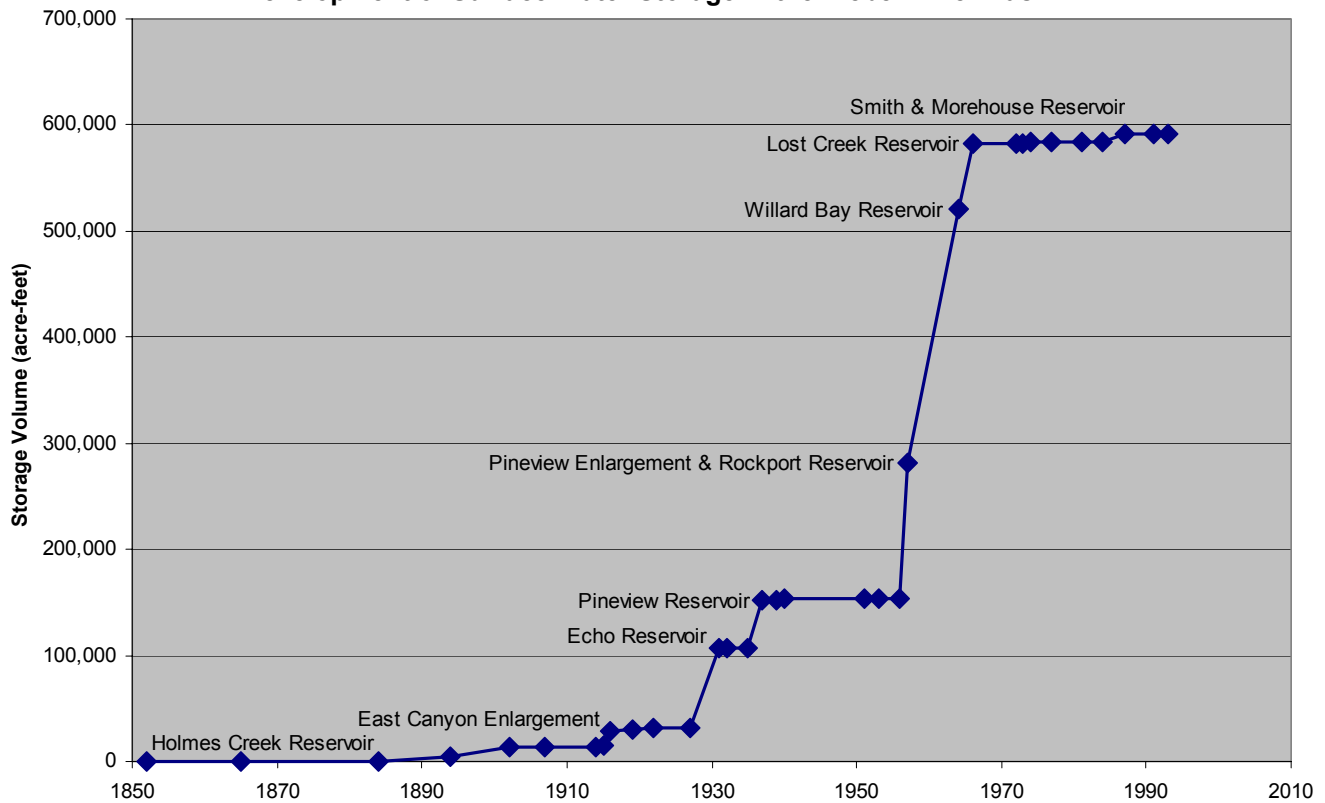
### **WATER DEVELOPMENT: MEETING SUPPLY AND INFRASTRUCTURE NEEDS**

Since Elias Adams built the first storage reservoir on Holmes Creek in 1852, harnessing the available water supply has played an indispensable role in the Weber River Basin. Figure 10 chronicles the legacy of water storage development within the basin. The importance of water development to the inhabitants of the basin is evident from the pioneers' initial efforts to the prosperity made possible by the larger endeavors of the 20th century. Although current residents within the basin often take these developments for granted, they are the beneficiaries of the visionary water developments of the past.

In order to secure sufficient water for the future, further innovative water developments will eventually be necessary in the Weber River Basin. The timing and size of these developments will depend on the ability of water conservation and other water-saving strategies to reduce water demand. All needed water developments will be based on sound engineering, economic and environmental principles.

This chapter outlines some of the water projects currently under construction or being investigated in the Weber River Basin. While most of these projects provide the infrastructure to deliver water storage that has already been developed, other projects, such as the Bear River Project, will develop additional water for use within the basin. This chapter also discusses the significance of water development through weather modification and urges local entities to fully participate in this program to enhance the water supply.

FIGURE 10  
Development of Surface Water Storage in the Weber River Basin



#### WATER DEVELOPMENT PROJECTS

Currently, there are only a handful of large water projects under consideration in the basin. These projects include the Kanesville Secondary Irrigation Project, two projects proposed for the Snyderville Basin and Park City areas, and the Bear River Project. The potential Green River Pipeline Project is also discussed briefly below. While the Kanesville and Snyderville Basin/Park City projects propose to develop infrastructure to utilize existing water storage, the Bear River and Green River Pipeline projects would develop additional water for use within the basin.

#### Kanesville Secondary Irrigation Project

Recently, the Kanesville Irrigation Company approached the Weber Basin Water Conservancy District (WBWCD) with a proposal to sell its operation to the district. The lands serviced by the irrigation company are quickly becoming urban, and the company felt that the district was better equipped to provide the

necessary conversions from agricultural to municipal and industrial use. Subsequently, WBWCD purchased the irrigation company and completed plans to service the area with a secondary water system. Acquisition of all the Kanesville Irrigation Company's water rights will also enable the district to supply the area with sufficient potable (drinking) water, without having to deplete any of its existing sources.

The existing secondary irrigation system acquired by the district services 561 acres. Upon build-out, a total of about 11,700 acres will be irrigated by the secondary system. The district estimates the total cost of developing the infrastructure for this area to be \$29.1 million, which includes a main aqueduct, lateral lines, a new storage reservoir and an enlarged Layton Canal. Although the district estimates that the total impact fee necessary to pay for the project is \$2,140 per residential acre and \$1,070 per commercial acre, the district Board has adopted to initially apply the existing impact fees of \$1,500 and \$750, respectively.<sup>1</sup>

### **Snyderville Basin and Park City Area Projects**

Increasing the water supply in the Snyderville Basin and Park City area is a top priority of Summit County officials and local water providers. As a result, several proposals to import water into the Snyderville Basin and Park City area have surfaced in recent years. Summit Water Distribution Company, a privately-owned company, proposes to import water from East Canyon Reservoir. Mountain Regional Water Special Service District, a Summit County public entity, proposes to import water into the basin from the main stem of the Weber River near Rockport Reservoir. While either project could potentially satisfy the immediate water needs in the Snyderville Basin and Park City area, long-term needs may necessitate the eventual construction of both projects. Which of the projects should be constructed first is a topic of intense local debate.

#### *East Canyon Pipeline Project*

The initial phase of Summit Water Distribution Company's project would pump approximately 5,000 acre-feet of water into the Snyderville Basin from East Canyon Reservoir. The company has already completed a

key feature of this project, an \$18 million water treatment plant near Jeremy Ranch. The treatment plant has been built to expand and accommodate future phases of the project, and has a total capacity 15,000 acre-feet. Presently, 1.4 miles of the 13-mile pipeline from the treatment plant to East Canyon Reservoir has also been constructed. Summit Water estimates the remaining portion of the pipeline could be constructed at a cost of about \$15 million.

The water supply for the East Canyon Pipeline Project would come from senior water rights held by the Davis & Weber Counties Canal Company. In a cooperative venture with the canal company, Summit Water Distribution Company would have access to some of the priority storage in both East Canyon and Echo Canyon reservoirs. This priority storage would provide an extremely reliable water supply for the project and allow the company to protect downstream water rights from interference. To date, shareholders of the canal company have authorized 5,000 acre-feet per year for use by the project. The additional 10,000 acre-feet per year that is necessary to complete future phases of the project would require further shareholder approval.

#### Rockport Pipeline Project

In cooperation with WBWCD, Mountain Regional Water Special Service District (MRWSSD) and Park City propose to import water into the basin from the main stem of the Weber River near Rockport Reservoir. The ultimate size and scope of this project has not yet been determined. Several preliminary investigations have been completed, wherein it was proposed to import up to 10,000 acre-feet of water into the basin at a cost of \$40-50 million.<sup>2</sup> However, MRWSSD and Park City have only entered into a contract with WBWCD to deliver 6,600 acre-feet per year of this total (4,100 acre-feet to MRWSSD and 2,500 acre-feet to Park City). Therefore, the initial phases of this project will only provide this amount.

The first phase of the project is already under construction and will deliver approximately 1,600 acre-feet per year of MRWSSD's 4,100 acre-feet total obligation to the Promontory Development, a housing and golf course development located at the eastern edge of the Snyderville Basin. The cost of this portion of the

project is estimated to be \$15 million. The remaining 5,000 acre-feet per year of contracted water would be delivered to Park City and MRWSSD through the same pipeline that is being built for the Promontory Development. Full delivery of this water would require further treatment and distribution infrastructure.

The water supply for this project will come from water rights held by the WBWCD in Smith and Morehouse Reservoir located on the upper Weber River in the Uinta Mountains. WBWCD completed the construction of Smith and Morehouse Reservoir in 1987 and has held most of the storage rights in the reservoir in reserve to meet the needs in the Snyderville Basin and Park City area. WBWCD is confident that these lower-priority water rights will be sufficient to meet the project needs.

### **Bear River Project**

The Bear River represents one of only two significant remaining water sources that are available to meet future growth along the Wasatch Front. The other significant source is the Colorado River. In the Bear River Development Act passed by the Legislature in 1991, the Division of Water Resources is directed to develop the surface waters of the Bear River and its tributaries. The act also allocates water among various entities and provides for the protection of existing water rights. The act allocates a total of 220,000 acre-feet of water annually as follows: the Jordan Valley Water Conservancy District (JVWCD) and WBWCD are entitled to 50,000 acre-feet each; and the Bear River Water Conservancy District and Cache County water users 60,000 acre-feet each. The total cost of the project is estimated to be between \$130-260 million, depending on whether or not a reservoir is needed for the initial project. If the project is constructed, the state of Utah will be obligated to construct diversion and, if necessary, storage and delivery facilities to move the water as far south as Willard Bay. All other required conveyance and treatment systems will be the responsibility of the contracting entities. In the Weber River Basin, this entity will be WBWCD.

Based on revised water need estimates, public response and cost analysis, the division's current plan for the Bear River Project is as follows: (1) negotiate an agreement with Weber Basin Water Conservancy District to modify the existing operation of Willard Bay to allow storage of Bear River water; (2) connect the Bear River with a pipeline or canal to Willard Bay; (3) construct conveyance and treatment facilities to deliver water from Willard Bay to the Wasatch Front (would be the responsibility of WBWCD and JWCD); and (4) build a storage reservoir in the Bear River Basin. While parts one through three would be timed to deliver water to the Wasatch Front by about 2035-2040,<sup>3</sup> part four would be carried out when the Bear River Water Conservancy District or Cache County water users need additional water or the needs of JWCD and WBWCD exceed the water developed by parts one through three. If the use of Willard Bay is not viable, part four would have to occur sooner.

### **Potential Green River Pipeline Project**

Alongside the Bear River, Utah's allocation of water from the Colorado River represents the most significant remaining source of water to meet the long-term needs along the Wasatch Front. Water from the Colorado River would most likely be imported from one of its major tributaries, the Green River, located in southwestern Wyoming or northeastern Utah.

Although the Utah Legislature has not directed the Division of Water Resources to develop the waters of the Green River as they have the waters of the Bear River, the division has conducted a preliminary cost analysis of several alignment options. In this preliminary analysis, the division investigated a pipeline that would import 60,000 acre-feet of water per year from either Fontenelle Reservoir in Wyoming or Flaming Gorge Reservoir in Utah into the Bear River or Weber River drainages. Because the Weber River Basin has existing infrastructure that would make it possible to deliver water to the Salt Lake Valley and the water is of higher quality, the division believes that the options that propose to import water into the Weber River Basin are more likely. Total costs of these options range from \$229 to \$297 million, with unit costs from \$232 to \$313

per acre-foot. These costs do not include any additional expenses that would be incurred to treat and distribute the water to where it would be used along the Wasatch Front or elsewhere.

Despite these results, there are sufficient concerns regarding water rights in the Colorado River that inhibit further investigation. These concerns are primarily related to reserved Indian water rights within the Colorado River Basin. These claims are being made by the Ute and Navajo Indian Nations and have not yet been quantified. Once these water rights claims are settled, water may not be available in the Colorado River for any new project, unless such water is leased from the Indians. These concerns would need to be resolved before any serious work on a Green River proposal could proceed.

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#### WEATHER MODIFICATION

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As noted in the Utah State Water Plan, weather modification (or cloud seeding) has long been recognized as a means to enhance existing water supplies in Utah. Cloud seeding assists nature in the formation of precipitation by providing droplet-forming nuclei at the proper times and places.

##### **Cloud Seeding Projects**

Currently, there is only one project area that seeds clouds to enhance the water supply of the Weber River Basin and surrounding basins; this area is the West Uintas area. Two other areas, the Ogden River and Wasatch Front areas have seeded clouds in the past but are currently inactive.

A study conducted by the Division of Water Resources estimates that other active project areas within the state have realized a 7-20 percent increase in April 1 snow water content.<sup>4</sup> This translates into an increase in estimated average annual runoff of about 250,000 acre-feet statewide, or 13 percent above historical runoff in the seeded areas. The division estimates the cost of water developed from cloud seeding these areas to be about one dollar per acre-foot.<sup>5</sup> With typical water costs ranging anywhere from \$100–350 per acre-foot, this

represents by far the most economical alternative available to water entities within the basin to supplement their water supplies.

During the water years 2001, 2002 and 2003 the cost of operating the West Uintas project ranged from \$67,800 to \$69,100. The state and local shares of these costs are illustrated in Table 20. WBWCD is the only entity within the basin which lends financial support to this cloud seeding project; other entities within the basin should consider the benefits of lending their support. Cloud seeding is most effective when it is continued over several years. Consistent cloud seeding increases soil moisture and provides greater ground water and spring flows, which help sustain base flows in streams and rivers. Seeding only in dry periods will not be as effective because of the lack of seedable storm systems.

TABLE 20  
West Uintas Area Cloud Seeding Costs

Cost Share Participant	Water Year*		
	2001	2002	2003
Weber Basin Water Conservancy District	\$18,450	\$16,900	\$20,218
Provo River Water Users Association	\$18,450	\$16,900	\$20,218
Board of Water Resources	\$32,200	\$33,900	\$28,604
<b>TOTAL</b>	<b>\$69,100</b>	<b>\$67,800</b>	<b>\$69,100</b>

\* A water year begins on October 1 of the previous year and ends on September 30 of the given year. Water year 2001: Oct. 1, 2000 to Sept. 30, 2001.

### Snowmaking at Ski Resorts

Several ski resorts within the Weber River Basin have snowmaking capabilities. The three major ski resorts within the Snyderville Basin alone are able to make approximately 7 million gallons worth of snow per day. Snow production at these and other ski resorts is significant to more than just visiting skiers, as it enhances the water stored in the winter snowpack. Increased snowpack helps prolong the spring runoff period and also provides greater ground water recharge to local aquifers. Although snowmaking does not produce a net gain in the available water supply, it does effect the timing of the runoff. Thus, water that would normally have made its way downstream during the winter months remains high in the basin until spring runoff begins.



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### UPGRADING AND ENHANCING EXISTING INFRASTRUCTURE

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Many water systems in the basin have sufficient water to meet needs through 2030 and beyond. Although they have sufficient water rights, many do not have the capacity or facilities to actually divert and deliver this water. Thus, simply upgrading and enhancing existing infrastructure will play an important role in meeting the water demands of the future. Other systems are very old and need upgrades and expansion to meet future needs and supply water efficiently as possible.

In a 2001 survey of drinking water systems conducted by the Utah Division of Drinking Water, 92 percent of the respondents within the Weber River Basin indicated that the overall physical condition of their system would need to be upgraded within the next 15 years, and 29 percent of the respondents indicated their present system was deficient, particularly with respect to its ability to maintain minimum fire flows.<sup>6</sup> Solutions to these problems include additional sources, new and enlarged piping, more storage capacity, and additional or larger water treatment facilities. The survey also revealed that 28 percent of systems do not collect enough revenue from water bills to meet the usual operation and maintenance expenses of their system, and only 24 percent of the systems collect sufficient funds to cover the costs of future improvements.<sup>7</sup>

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### FUNDING

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Water projects have become increasingly complex and expensive. The developable water is now farther away and deeper in the ground, and the available dam sites need more work to make them suitable. Projects in or near urban areas must work around existing features and pay a higher price for land purchases, easements and rights-of-way. Environmental considerations also add to project costs, as habitat and species protection must be considered in project planning, construction and operation.

The water funding programs administered by state and federal governments have been important in developing water projects and infrastructure.<sup>8</sup> State funding programs are generally low-interest loans that,

when repaid, fund other water projects through a revolving fund but also may include grants which are not repaid.

Over the years, the people of Utah have benefited substantially from the various funding programs. The federal share of constructing the basin's largest projects, including the Ogden River Project, the Weber River Project and the Weber Basin Project, have directly benefited those living in the Weber River Basin. In addition to federal funding, state funding programs have played an important role in the basin's water development. During the period 1947-2002, entities in the basin have received a total of \$96 million in financial assistance (primarily low interest loans) from the Utah Board of Water Resources alone. This is approximately \$30 million more than any other major river basin in the state and does not include two other important state funding programs. In order to meet growing demands within the basin, especially in the Snyderville Basin and Park City areas, further investment will be necessary.

Ultimately, water users within the basin will need to bear more of the costs associated with water development. As an absolute minimum, water suppliers within the basin should set their rates such that all operation and maintenance costs are satisfied. Funding trends and sound financial planning would dictate that sufficient money also be set aside for capital improvements.

#### NOTES

<sup>1</sup> Weber Basin Water Conservancy District, *Capital Facilities Plan and Impact Fee Analysis*, (Layton: 2000), 20, 21.

<sup>2</sup> Montgomery Watson Harza and Bowen, Collins & Associates, *Wanship Water Transmission System Predesign Study – Updated Transmission and Storage Evaluation*, (Utah: 2001).

<sup>3</sup> From Jordan Valley Water Conservancy District's, "Water Supply Plan (Drought Year Scenario)" graph dated, May 2004.

<sup>4</sup> Norman E. Stauffer and Keven Williams, *Utah Cloud Seeding Program: Increased Runoff/Cost Analyses*, (Salt Lake City: Utah Division of Water Resources, 2000), 6.

<sup>5</sup> Ibid, 9.

<sup>6</sup> Utah Division of Drinking Water, *2001 Survey of Community Drinking Water Systems*, (Salt Lake City: Department of Environmental Quality, 2002). An annual survey prepared in cooperation with the Division of Water Rights and the Division of Water Resources. While this document shows only statewide results, the source data was used to obtain values specific to the Weber River Basin.

<sup>7</sup> Ibid.

<sup>8</sup> For a thorough listing of funding programs administered by the state and federal governments, see Division of Water Resources, *Weber River Basin Plan*, (Salt Lake City: Department of Natural Resources, 1997), sec. 8.